CHAPTER 1

INTRODUCTION

1.1 Overview

Convolution encoder is a code that have been widely used in numerous applications in order to achieve reliable data transfer, including digital video broadcasting, digital audio broadcasting, satellite communication, cellular mobile, and satellite communication. As the capabilities of FEC increase, the number of errors that can be corrected also increases. The advantage is obvious. Noisy channels create a relatively large number of errors. The ability to correct these errors means that the noisy channel can be used reliably. This enhancement can be parlayed into several system improvements, including bandwidth efficiency, extended range, higher data rate, and greater power efficiency, as well as increased data reliability.

Convolution code is a type of error correcting code that is normally used in telecommunication. On the other hand, this convolution encoding is used to encode data prior to transmission over a channel. The received data is decoded by the classic Viterbi decoder. In a basic convolution encoder, two or three bits (depending on the encoder output rate) are transmitted over the channel for every input bit.

Its popularity of using the convolution encoder for forward error correction is came from the structure and availability that is easy and simple to implement. The purposes of convolution code are to improve channel capacity during the transmission and the other is to mitigate burst error occurs the transmission.

In developing digital system design, a main techniques use is by using Very High Speed Integrated Circuit Hardware Description Language (VHDL) in order to programmed it in software where simulation can be perform to do analysis and then the result will be compared to the analysis result that have been perform by using MATLAB software. Xilinx ISE 10.1 and MATLAB software are use in order to encode the data and develop a convolution encoder.

1.2 Problem Statement

Modern digital communication system requirements are becoming more and more stringent with respect to error-free transmission. Next generation systems would likes to offer Quality of Service (QoS) guarantees to users, this cannot be done unless more efficient error correction schemes can be implemented. There is also exponential growth in the Wireless industry for the same demands but that require less power.

The Convolution Encoder for Forward Error Correction (FEC) is used to implement and solve this problem. This method will allow the receiver to detect and correct the errors (within some bound) without the need to ask the sender for additional data, compared to Automatic Repeat Request (ARQ) method which is if the sender does not receive an acknowledgment before the timeout, it will re-transmits the frame/packet data until the sender receives an acknowledgment or exceeds a predefined number of re-transmission